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New ascomycete records from Guatemala

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ABSTRACT — Thirty-two species of ascomycetes were previously recorded from Guatemala. This paper describes 12 newly recorded species, representing five orders and twelve genera. Three previously reported species are redescribed because there are few data in the Guatemalan literature.

KEY WORDS — *Helotiales*, *Hypocreales*, *Orbiliales*, *Pezizales*, *Xylariales*, Central America

Introduction

Guatemala is a country of >108,000 km². The name Quauhtemallan (Guatemala) means “land of trees,” referring to the original wide extent and diversity of forests. Guatemala has been categorized as biologically mega-diverse (Tolisano & López 2010), but little is known about the fungal diversity of this country and adjacent areas. There have been few studies on fungal diversity, and the knowledge of the ascomycetes is poor; only 33 ascomycetes species have been reported in previous studies (TABLE 1). The present study is part of a project that began in 2007 to document the ascomycete diversity of Guatemala.

Materials & methods

The study was based on a bibliographic revision and additional material collected mainly from oak forests and cloud forests of the west of Guatemala. The following literature was used for identifications: Abbot & Currah (1997); Breitenbach & Kränzlin (1984); Dennis (1954; 1963; 1970; 1978), Glawe & Rogers (1984), Haines & Dumont (1984); Hsieh et al. (2005); Ju & Rogers (1996); Medel (2002) Medel & Calonge, (2004); Méndez-Mayboca et al. (2007); Ramamurthi et al. (1957); San Martín et al. (1998), and

TABLE 1. Ascomycete species recorded from Guatemala.

(New records in bold font.)

Helotiales

Bisporella citrina	This paper
<i>Chlorociboria aeruginascens</i> (Nyl.) Kanouse ex C.S. Ramamurthi et al.	Flores et al. (2012)
C. aeruginosa	This paper
Lachnum abnorme	This paper
<i>L. brasiliense</i>	Haines & Dumont (1984); this paper
L. cyphelloides	This paper
L. virgineum	This paper
<i>Leotia lubrica</i> (Scop.) Pers.	Sommerkamp & Guzmán 1990
<i>Trichoglossum farlowii</i> (Cooke) E.J. Durand	Flores et al. (2002, 2012)

Hypocreales

<i>Cordyceps melolonthae</i> (Tul. & C. Tul.) Sacc.	Flores et al. (2012)
<i>C. militaris</i> (L.) Fr.	Flores et al. (2012)
<i>Hypomyces hyalinus</i> (Schwein.) Tul. & C. Tul.	Sommerkamp & Guzmán (1990)
<i>H. lactifluorum</i> (Schwein.) Tul. & C. Tul.	Bran et al. (2003)
Ophiocordyceps gracilis	This paper

Orbiliiales

Hyalorbilia inflatula	This paper
Orbilia juruensis	This paper

Pezizales

<i>Aleuria aurantia</i> (Pers.) Fuckel	Sommerkamp & Guzmán (1990)
<i>Cookeina sulcipes</i> (Berk.) Kuntze	Sommerkamp & Guzmán (1990)
<i>Gyromitra infula</i>	Bran et al. (2003); this paper
Helvella acetabulum	This paper
<i>H. crispa</i> (Scop.) Fr.	Bran et al. (2003)
<i>H. elastica</i> Bull.	Sommerkamp & Guzmán (1990)
<i>H. lacunosa</i> Afzel.	Bran et al. (2003); Sommerkamp & Guzmán (1990)
<i>H. macropus</i> (Pers.) P. Karst.	Bran et al. (2003); Sommerkamp & Guzmán (1990)
<i>Melastiza chateri</i> (W.G. Sm.) Boud.	Flores et al. (2002)
<i>Morchella costata</i> (Vent.) Pers.	Sommerkamp & Guzmán, (1990)
<i>M. elata</i> Fr.	Bran et al. (2003)
<i>M. esculenta</i> (L.) Pers.	Sommerkamp & Guzmán (1990); Bran et al. (2003)
<i>M. guatemalensis</i> Guzmán et al.	Guzmán et al. (1985)
<i>Otidea onotica</i> (Pers.) Fuckel	Flores et al. (2002)
<i>Phillipsia guatemalensis</i> Paden	Paden 1977
<i>Pithya cupressina</i> (Batsch) Fuckel	Sommerkamp & Guzmán (1990)
<i>Scutellinia scutellata</i> (L.) Lambotte	Sommerkamp & Guzmán (1990)
<i>Wynnea americana</i> Thaxt.	Flores et al (2002; 2012)

Xylariales

<i>Annulohypoxylon thouarsianum</i>	Sharp (1948), Flores et al. (2012); this paper
Daldinia concentrica	This paper
<i>D. fissa</i> Lloyd	Morales et al. (2006)
<i>D. vernicosa</i> Ces. & De Not.	Bran et al. (2003)
Diatrypella pulvinata	This paper
<i>Phylacia poculiformis</i> (Mont.) Mont.	Sommerkamp & Guzmán (1990)
Poronia pileiformis	This paper
<i>Xylaria cubensis</i> (Mont.) Fr.	Sharp (1948)
<i>X. multiplex</i> (Kunze) Fr.	Sommerkamp & Guzmán (1990)
<i>X. polymorpha</i> (Pers.) Grev.	Flores et al. (2012)

Spooner (1987). All material studied was deposited in the mycological collection at XAL herbarium (Instituto de Ecología, A.C., Veracruz, Mexico) and duplicate specimens were deposited in mycological collection MICG (Universidad de San Carlos, Facultad de Ciencias Químicas, Guatemala, Guatemala). Microscopic features were examined in KOH 5% and Melzer's iodine reagent, and at least 20 measurements of ascospores were made per collection. Photographs were taken with a Sony Cyber Shot Camera, and some photographs of spores were cleared of spots, stains and bubbles using Photoshop CS5 software.

Helotiales

Bisporella citrina (Batsch) Korf & S.E. Carp., Mycotaxon 1: 58 (1974) FIG. 1

Apothecia discoid to cupulate shaped, attached to the substrate by a short stalk. Disc 1 mm diameter. Stalk 0.6 mm long, cylindrical. Hymenium bright yellow and smooth outer surface. Asci cylindrical, $57\text{--}80 \times 5\text{--}7\ \mu\text{m}$, small pore blue in Melzer's reagent. Ascospores elliptical, smooth hyaline, with 2 guttules, with a single septum when mature, $7\text{--}10 \times 2\text{--}3\ \mu\text{m}$. Paraphyses filiform with rounded tips, $1\text{--}1.5\ \mu\text{m}$ thick, hyaline, thin walled.

HABITAT — Gregarious, lignicolous; in cloud forest at 1500 m.

MATERIAL EXAMINED — GUATEMALA. CHIMALTENANGO DEPARTMENT, San Andres Itzapa Municipality, Aldea La Hierbabuena, 27 June 2007, Medel 1451 (XAL).

The bright yellow apothecia and ascospore size are diagnostic for this species. *Bisporella citrina* is widely distributed (Dennis 1970, 1978; Breitenbach & Kränzlin 1984; Medel & Calonge 2004; Méndez-Mayboca et al. 2007). This represents a new record for Guatemala.

Chlorociboria aeruginosa (Oeder) Seaver ex C.S. Ramamurthi, Korf &

L.R. Batra, Mycologia 49: 859 (1958) ["1957"] FIG. 2

Apothecia globose to discoid shaped, irregularly distorted, 12 mm diameter, attached to the substrate by a short central stipe; hymenium smooth, blue-green. Stalk cylindrical, 0.5 mm long. Asci cylindrical, 8-spored, $(57\text{--}) 70\text{--}80 \times 5\text{--}6\ \mu\text{m}$, small blue pore in Melzer's reagent. Ascospores irregularly fusiform, smooth, hyaline, with 2 guttules, $9\text{--}15 \times 2\text{--}3\ \mu\text{m}$. Paraphyses with rounded tips, $1\text{--}1.5\ \mu\text{m}$ thick.

HABITAT — Gregarious, lignicolous; in *Cupressus* forest at 1500 m.

MATERIAL EXAMINED — GUATEMALA. GUATEMALA DEPARTMENT, Universidad de San Carlos de Guatemala, University Campus, Parque Ecológico Las Ardillas, 28 June 2007, Medel 1495 (XAL); CHIMALTENANGO DEPARTMENT, San Andrés Itzapa Municipality, Aldea la Hierbabuena, 27 June 2007, Medel 1446 (XAL, MICG).

According to Dixon (1975) this species is close to *C. aeruginascens*, which also has the same green color but which differs in smaller ascospores ($6\text{--}10 \times 1.5\text{--}2\ \mu\text{m}$). *Chlorociboria aeruginosa* is distributed in North, South, and Central

America, China, India, Japan, and the Philippines (Dixon 1975) and Venezuela (Mardones-Hidalgo & Iturriaga 2011). Despite being a widely distributed species, in Guatemala the species was not known.

Lachnum abnorme (Mont.) J.H. Haines & Dumont, Mycotaxon 19: 10 (1984)

FIGS 3–4

Apothecia discoid, with white hairs, stipe very small and sometimes almost sessile, 1 mm wide $\times$ 0.5 mm tall, hymenium light to dark yellow. Hairs sub-cylindrical with blunt apex, with coarse granules, hyaline, with 2–3 septa, thin walled, (40–)60–88 $\times$ (3–)3.5–4 μ m. Asci cylindrical, 8-spored (75–)87–94 $\times$ 7–8 μ m, small blue pore in Melzer's reagent. Ascospores straight to s-shaped, hyaline, (38–)40–57 $\times$ 2 μ m. Paraphyses lanceolate, (77–)94–102(–110) $\times$ 3–3.5 μ m, hyaline, 3–4-septate.

HABITAT — Gregarious, lignicolous; in *Cupressus* forest at 1500 m.

MATERIAL EXAMINED — GUATEMALA. GUATEMALA DEPARTMENT, Universidad de San Carlos de Guatemala, University City, Parque Ecológico Las Ardillas, 28 June 2007, Medel 1486 (XAL).

The studied specimen fitted well with the descriptions by Dennis (1963), Haines & Dumont (1984), and Spooner (1987). *Lachnum abnorme* is widely distributed in tropical regions of the world: Australia, New Zealand, Chile, India, Central America, and Costa Rica (Haines & Dumont 1984); Panama (Piepenbring 2006); and Venezuela (Mardones-Hidalgo & Iturriaga 2011). This is the first record to Guatemala.

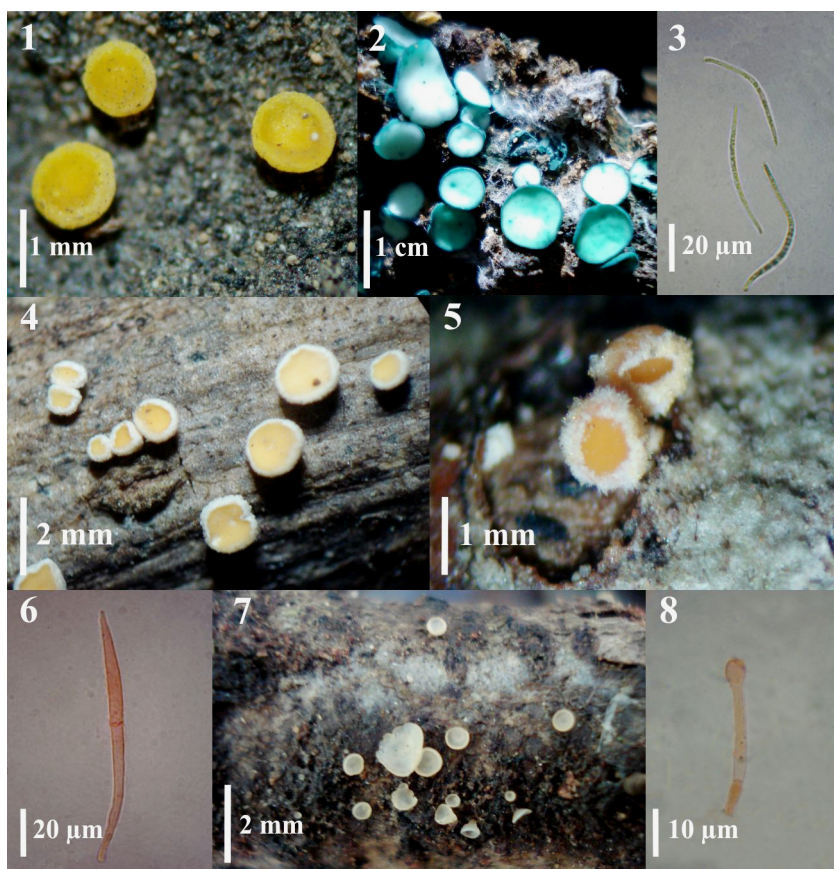
Lachnum brasiliense (Mont.) J.H. Haines & Dumont, Mycotaxon 19: 23 (1984)

Apothecia scattered on bark, light to dark yellow hymenium, 1.2 mm wide disc, shallow receptacle, shaped cup with a hairy short stalk, white to pale buff color and a blue-black base. Hairs cylindrical with obtusely rounded tips, (52–)60–75(–80) $\times$ 3–4 μ m septate, thin walled, granulated. Asci cylindrical, (66–)78–82(–84) $\times$ 7–9 μ m, 8-spored, hyaline, small blue pore in Melzer's reagent. Ascospores narrowly fusiform, cylindrical, usually slightly curved, occasionally becoming 3-septate, (30–)32–43 $\times$ 2.5–3 μ m. Paraphyses cylindrical, (68–)72–91 $\times$ 2–3 μ m, 1–3-septate.

HABITAT — Gregarious, lignicolous; in cloud forest at 1800 m.

MATERIAL EXAMINED — GUATEMALA. CHIMALTENANGO DEPARTMENT, San Andrés Itzapa Municipality, Aldea La Hierbabuena, 27 July 2007, Medel 1475 (XAL).

The dark to medium yellow ascomata clothed with white hairs and the blue-black base of the stalk are distinctive characters. *Lachnum brasiliense* is a common species in the tropics and has previously reported from Guatemala (Haines & Dumont, 1984) in pine forest. The material examined was found in cloud forest.



FIGURES 1–8. *Bisporella citrina*: 1, ascospores. *Chlorociboria aeruginosa*: 2, apothecia. *Lachnum abnorme*: 3, ascospores; 4, apothecia. *Lachnum cyphelloides*: 5, apothecia. *Lachnum virgineum*: 6, paraphyses in Congo red. *Hyalorbilia inflatula*: 7, apothecia. *Orbilia juruensis*: 8, paraphyses. Bars: 1, 8 = 10 µm; 2 = 1 cm; 3, 6 = 20 µm; 4, 7 = 2 mm; 5 = 1 mm.

Lachnum cyphelloides (Pat.) J.H. Haines & Dumont, Mycotaxon 19: 30 (1984) FIG. 5

Apothecia yellow translucent, disc 1 mm wide $\times$ 1.2 mm of height, long stipitate, small white hairs to almost smooth. Hairs cylindrical, with obtusely rounded tips, $48\text{--}70 \times 3\text{--}4$ µm septate, hyaline, thin wall, granulated. Asci cylindrical $66\text{--}67 \times 6\text{--}7$ µm, small blue pore in Melzer's reagent. Ascospores fusiform, $31\text{--}40 \times 1.5\text{--}2$ µm hyaline. Paraphyses lanceolate, $(68\text{--}) 72\text{--}91 \times 2\text{--}3$ µm hyaline, 1–3-septate.

HABITAT — Gregarious, lignicolous; in cloud forest at 1800 m.

MATERIAL EXAMINED — GUATEMALA. GUATEMALA DEPARTMENT, Universidad de San Carlos de Guatemala, University Campus, Parque Ecológico Las Ardillas, 27 July 2005, Medel 1465-A (XAL); 28 July 2005, Medel 1446 (XAL, MICG).

According to Haines & Dumont (1984), *L. cyphelloides* is covered with white hair, has a yellow pale disc, and its stipe lacks a blue-black base. The species is distributed in Central America, northern South America, and the Lesser Antilles (Haines & Dumont, 1984; Piepenbring 2006). This is first record for Guatemala.

Lachnum virgineum (Batsch) P. Karst., Bidr. Känn. Finl. Nat. Folk 19: 169 (1871)

FIG. 6

Apothecia concave smooth disc, 1–1.5 mm in diameter, white to creamy white, and margin enrolled when it dries. Central stipe, covered with white hairs, 1–1.2 mm of height. Hairs cylindrical, with obtusely rounded tips, 75–100 × 4–5 µm septate, thin walled, granulated hyaline. Asci cylindrical asci, 8-spored, 34–45 × 4–5 µm, thin walled, small blue pore in Melzer's reagent. Ascospores fusiform, 6–8 × 1.5–2 µm, thin walled, hyaline. Paraphyses lanceolate, 70–100 × 5–6 µm, septate, hyaline, longer than the asci.

HABITAT — Gregarious, lignicolous; in tropical forest at 160 m.

MATERIAL EXAMINED — GUATEMALA. ALTA VERAPAZ DEPARTMENT, Cobán Municipality, Ecorregión Lachúa, 17 September 2005, López y Quezada 2473 (XAL).

Lachnum virgineum is characterized by apothecia covered by straight, white granulate hairs. Spooner (1987) reported the species from North and South America, Europe, North Africa, Central Asia, India, Japan, Papua New Guinea, and Australia. This is a new record for Guatemala.

Hypocreales

Ophiocordyceps gracilis (Grev.) G.H. Sung, J.M. Sung, Hywel-Jones & Spatafora, Stud. Mycol. 57:43 (2007)

Stromata with long cylindrical apices terminating in 5 × 3 mm heads, red ochraceous, with dark dotted perithecial ostioles. Stipe yellow-olive. Asci with many individual spores, 250–280 × 6 µm, pore not blue in Melzer's reagent. Ascospores cylindrical, smooth, 7–10 × 1–2 µm, hyaline, lined chainlike upon each other within the ascus. Paraphyses not observed.

HABITAT — Solitary, on larvae of *Lepidoptera*; in cloud forest, 1800 m.

MATERIAL EXAMINED — GUATEMALA. CHIMALTENANGO DEPARTMENT, San Andrés Itzapa Municipality, Aldea La Hierbabuena, 21 June 2007, Medel 1466 (XAL).

Our specimen was consistent with the descriptions by Mains (1958), Dennis (1978), and Breitenbach & Kränzlin (1984). *Ophiocordyceps gracilis* is always associated with lepidopteran larvae. This is the first report for Guatemala.

Orbiliales

Hyalorbilia inflatula (P. Karst.) Baral & G. Marson, Micologia 2000 (Trento): 44 (2000)

FIG. 7

Apothecia less than 1.5 mm wide, orange to yellow color, with rolled margin. Asci cylindric-clavate, rounded apex, 8-spored, $21-23(-29) \times 3-3.5(-4) \mu\text{m}$, pore not blue in Melzer's reagent. Ascospores cylindrical, straight or slightly curved, rounded ends, $4-8 \times 0.8-1 \mu\text{m}$. Paraphyses cylindrical hyaline, $18-21 \times 2(-2.5) \mu\text{m}$, septate, with apices encrusted to form a thin epithelial layer.

HABITAT — Gregarious, lignicolous; in cloud forest and *Cupressus* forest at 1800 m.

MATERIAL EXAMINED — GUATEMALA. CHIMALTENANGO DEPARTMENT, San Andrés Itzapa Municipality, Aldea La Hierbabuena, 27 June 2007, Medel 1467, 1484 (XAL); GUATEMALA DEPARTMENT, Universidad de San Carlos de Guatemala, University Campus, Parque Ecológico Las Ardillas, 28 June 2007, Medel 1485-B (XAL, MICG).

Our specimen agreed with the description by Spooner (1987). Liu et al. (2006) note that *Hyalorbilia inflatula* is widely distributed in China. The species has also been recorded from Venezuela (Mardones-Hidalgo & Iturriaga 2011). This is the first report for Guatemala.

Orbililia juruensis Henn., Hedwigia 43: 270 (1904)

FIG. 8

Apothecia superficial, sessile or subsessile, disc convex or undulate, with crenulate margin, translucent orange-yellow, smooth, 1 mm diameter. Receptacle smooth, concolorous or slightly paler than the disc, thin at the margin and thicker towards the centre. Asci cylindric-clavate, broadest at the apex and tapered downwards to a narrow base which is sometimes forked, apex truncate or obtusely rounded, $29-37 \times 3.5-4 \mu\text{m}$, pore not blue in Melzer's reagent. Ascospores straight or slightly inequilateral to fusoid, hyaline, $(6-) 7-9(-10) \times 1-1.5 \mu\text{m}$, not septate. Paraphyses capitate, tips up to $3.5-4 \mu\text{m}$ diameter, $21-30 \times 2-3 \mu\text{m}$, 1-2-septa in the lower part.

HABITAT — Gregarious, lignicolous; in *Cupressus* forest at 1500 m.

MATERIAL EXAMINED — GUATEMALA. GUATEMALA DEPARTMENT, Universidad de San Carlos de Guatemala, University Campus, Parque Ecológico Las Ardillas, 28 June 2007, Medel 1491 (XAL).

This species is known from South America, Australasia, and Solomon Island (Spooner 1987), Argentina (Wright & Wright 2005), and Panama (Piepenbring 2006). This is the first record for Guatemala.

Pezizales

Gyromitra infula (Schaeff.) Quél., Enchir. Fung.: 272 (1886)

Ascoma bilobate or saddle-shaped, generally fused with the stipe. The hymenium covers the whole surface, which is cinnamon to dark brown. The

interior is hollow and whitish. The stipe is smooth, often somewhat furrowed or pitted, and finely felty towards the base. Asci cylindrical, $(140\text{--})150\text{--}250 \times 15\text{--}17 \mu\text{m}$. Ascospores elliptical, smooth, with 2 guttules, hyaline, $18\text{--}22 \times 8\text{--}10 \mu\text{m}$. Paraphyses clavate, $80\text{--}100 \times 7\text{--}10 \mu\text{m}$.

HABITAT — Solitary or gregarious, humicolous; in *Pinus–Abies* forest, 2900 m.

MATERIAL EXAMINED — GUATEMALA. TOTONICAPAN DEPARTMENT, Totonicapan Municipality, Mercado municipal de Totonicapan, 18 September 2001, Morales 295 (MICG); 19 August 2006, Morales 561 (MICG); Totonicapan Municipality, Aldea Panquix, 31 August 2003, Morales 485 (MICG).

The bilobate or saddle-shaped ascoma is characteristic of this species (Abbott & Currah 1997). Bran et al. (2003) previously reported this species from Guatemala, and it is also known from Mexico (Medel 2005).

Helvella acetabulum (L.) Quél., Enchir. Fung. 275 (1886)

Ascoma cup-shaped with an irregular margin, 25–50 mm broad; fertile surface dull brown. Lower surface smooth to subglabrous, light brown with conspicuous pallid to cream raised ribs extending from the stipe base to middle of the cup; thick whitish deeply ridged. Asci cylindrical, $200\text{--}300 \times 14\text{--}17 \mu\text{m}$. Ascospores broadly elliptical, hyaline, $15\text{--}21(\text{--}22) \times 11\text{--}15 \mu\text{m}$, smooth, with one guttule. Paraphyses with rounded tips, 5–6 μm thick.

HABITAT — Solitary, humicolous; in pine–oak forest at 2300 m.

MATERIAL EXAMINED — GUATEMALA. CHIMALTENANGO DEPARTMENT, Tecpan Municipality, Mercado municipal de Totonicapan, 7 October 1999, Morales 47 (MICG)

The ridged pale brown apothecium is characteristic of this species (Calonge & Arroyo 1990, Abbot & Currah 1997). The species is known from Canada (Abbot & Currah 1997), China (Zhuang 2004), Mexico (Medel & Calonge 2004; Vite-Garín et al. 2006) and Spain (Calonge & Arroyo 1990). This is the first record for Guatemala.

Xylariales

Annulohypoxylon thouarsianum (Lév.) Y.M. Ju, J.D. Rogers & H.M. Hsieh,

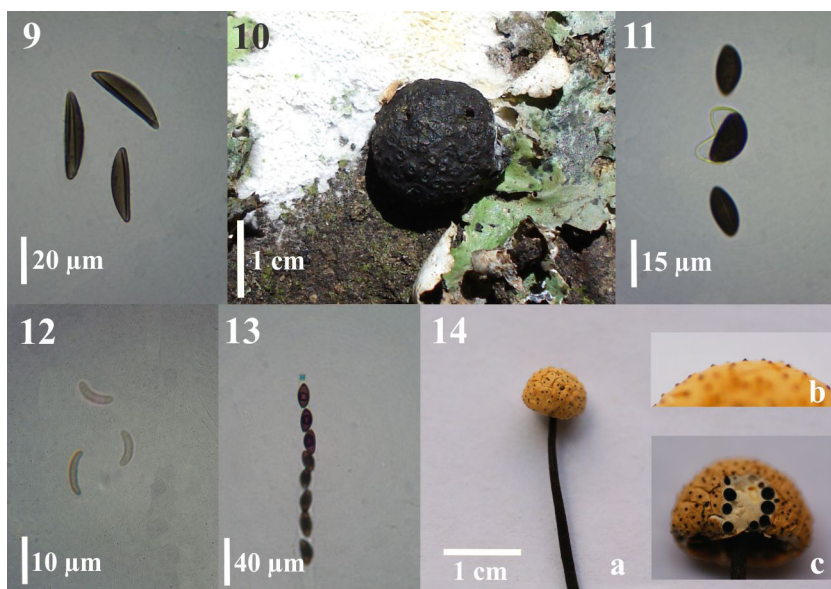
Mycologia 97: 861 (2005)

FIGS 9–10

Stromata sessile, globose, 12 mm wide $\times$ 7 mm high, with papillate ostioles in the middle of a deep ring, surface dark brown to black, carbonaceous, context fibrous woody, radially lined to faintly concentrically zoned grey and brown. Asci not observed. Ascospores inequilateral narrowly elliptical to slightly fusoid, light to medium brown, smooth, $23\text{--}27 \times 6\text{--}7 \mu\text{m}$, with a germ slit spore length on the flattened side. Paraphyses not seen.

HABITAT — Gregarious, lignicolous; in oak forest.

MATERIAL EXAMINED — GUATEMALA. CHIMALTENANGO DEPARTMENT, Tecpan Municipality, Astillero Municipal, 21 July 2007, Medel 1436 (XAL).



FIGURES 9–14. *Annulohypoxyton thouarsianum*: 9, ascospores in KOH 5%; 10, stromata. *Daldinia concentrica*: 11, ascospores in 5% KOH. *Diatrypella pulvinata*: 12, ascospores in 5% KOH. *Poronia pileiformis*: 13, ascus with blue pore + in Melzer's solution; 14, stromata (ostiole and perithecia). Bars: 9 = 20 µm; 10, 14 = 1 cm; 11 = 15 µm; 12 = 10 µm; 13 = 40 µm.

The species was first recorded from Guatemala by Sharp (1948) as *Hypoxyton malleolus* Berk. & Ravenel, a synonym of *A. thouarsianum* (Ju & Rogers 1996, Hsieh et al. 2005). This is a common xylariaceous species with greenish pigments in KOH and papillate ostioles in the middle of a deep disc (Ju & Rogers 1996; Medel 2002). The species is also known from Mexico (Pérez-Silva 1987; Medel 2002) and Panama (Piepenbring 2006).

Daldinia concentrica (Bolton) Ces. & De Not., Comm. Soc. Crittog. Ital. 1: 197 (1863)

FIG. 11

Stromata, globose circular to oval shaped 20–30 mm wide, sessile and, attached to the substrate, hard surface, reddish-brown to blackish young, and finally black. Asci cylindrical, 100–130 × 7–8 µm, uniseriate. Ascospores broadly elliptical to bean shape, dark brown, germ line straight, 13–15 × (6–) 6.5–7 µm. Paraphyses not seen.

HABITAT — Gregarious, lignicolous; in oak forest.

MATERIAL EXAMINED — GUATEMALA. CHIMALTENANGO DEPARTMENT, Tecpan Municipality, Astillero Municipal, 21 July 2007, Medel 1423 (XAL).

The important diagnostic characters of this species are the concentric lines in the stromata, and purple stromatal pigment in 5% KOH (Ju et al. 1997; Rogers et al. 1999). In Guatemala two species have been cited: *D. vernicosa* (Bran et al. 2003) and *D. fissa* (Morales et al. 2006). *Daldinia concentrica*, not previously reported for Guatemala, is also known from Mexico (Pérez-Silva 1978) and Europe, India, New Zealand, Taiwan, and the United States of America (Ju & Rogers 1997).

Diatrypella pulvinata Nitschke, Pyrenomyc. Germ. 1: 72 (1867) FIG. 12

Stromata pulvinate to oval, ostioles 3–5 sulcate, with endostromatic yellow whitish tissue. Asci multispored. Ascospores $7-9 \times 1.5-2 \mu\text{m}$, slightly curved (allantoid), hyaline, with 2 guttules. Paraphyses not seen.

HABITAT — Gregarious, lignicolous; in *Cupressus* forest at 1500 m.

MATERIAL EXAMINED — GUATEMALA. GUATEMALA DEPARTMENT, Universidad de San Carlos de Guatemala, University Campus, Parque Ecológico Las Ardillas, 28 July 2007, Medel 1489 (XAL).

The black sessile and pulvinate stromata with papillate ostioles are typical. *Diatrypella pulvinata* is known from Costa Rica, Europe, and the United States of America (Glawe & Rogers 1984; Chacón & Humaña 2006). This is the first record for Guatemala.

Poronia pileiformis (Berk.) Fr., Nova Acta R. Soc. Scient. Upsal., Ser. 3, 1: 129 (1851) FIGS 13–14

Stromata simple to branched, at the top of the stalk it has a small umbelliform 4–6 mm broad head, beige with dark dots (perithecial ostioles), smooth and leathery, later becoming hard and brittle. Ostioles papillate. Stipe dark brown to black, 60–70 mm high $\times$ 1–6 mm wide, smooth or ribbed with a thickened base. Asci cylindrical, $100-130 \times 4-5 \mu\text{m}$, pore blue in Melzer's reagent. Ascospores ellipsoid, dark brown, $7-11 \times 4-5 \mu\text{m}$, with a straight germ line as long as the length of the spore. Paraphyses not seen.

HABITAT — Gregarious, fimicolous, in tropical forest at 160 m.

MATERIAL EXAMINED — GUATEMALA. ALTA VERAPAZ DEPARTMENT, Cobán Municipality, Ecorregión Lachuá, 19 September 2005, López y Quezada 2473 (XAL).

This species is distinguished by the simple or branched stromata with a beige head with black papillate ostioles, growing on dung (Dennis 1957; San Martín et al. 1998). It is known from Costa Rica, Mexico, Peru, and Philippines. This is the first record for Guatemala

Discussion

With the new records, there are now 44 ascomycete species known from Guatemala (TABLE 1). The species encompass 26 genera of which *Helvella*

(5) and *Morchella* (4) provided the most records. The *Pezizales* was the most diverse order with 11 genera and 18 species. About 50% of the 200 specimens collected during the last survey in 2007 might represent new records or even new species.

The continued study of ascomycetes and other fungi from Guatemala will improve the knowledge of these organisms. This is essential because deforestation threatens to decrease the fungal biodiversity in this country. Recent deforestation data from Guatemala indicate a net 2006-2010 deforestation rate of over 38,000 ha / year (Regalado et al. 2012).

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